

## V. CLAIMS

What is claimed is:

1. A composition comprising an isolated mutant of an ARA54 peptide comprising a peptide having at least 80% identity to SEQ ID NO:1, wherein the peptide prevents homodimerization of ARA54.
2. The composition of claim 1, wherein the mutant ARA further comprises a substitution at position 472 of SEQ ID NO:1.
3. The composition of claim 2, wherein the mutant ARA comprises a lysine substitution at position 472 of SEQ ID NO:1..
4. A composition comprising a nucleic acid encoding the mutant ARA of claims 1-3.
5. The composition of claim 4, wherein the nucleic acid further comprises a promoter sequence operably linked to the sequence encoding the mutant ARA.
6. A composition comprising a cell comprising the nucleic acid of claim 5.
7. An animal comprising the cell of claim 6.
8. A method of inhibiting androgen receptor transactivation comprising administering the composition of claim 4.
8. A method of inhibiting androgen receptor transactivation comprising administering the composition of claims 1-3.
9. A method of identifying a molecule that modulates the activity of androgen receptor comprising administering the molecule to a system comprising androgen receptor and the composition of claims 1-3, assaying the activity of androgen receptor, and selecting molecules that modulate the activity of androgen receptor.
10. The method of claim 9, wherein the system further comprises ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
11. The method of claim 9, wherein the system further comprises a nucleic acid encoding the ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity.
12. The method of claim 9, wherein the system further comprises two molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
13. The method of claim 9, wherein the system further comprises three molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
14. The method of claim 9, wherein the system further comprises four molecules wherein the

molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

15. The method of claim 9, wherein the system further comprises five molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

16. The method of claim 9, wherein the system further comprises six molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

17. The method of claim 9, wherein the system further comprises seven molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity in any combination.

18. The method of claim 9, wherein the system further comprises eight molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity in any combination.

19. The method of claim 9, wherein the system further comprises ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, and supervillin.

20. A method of identifying a dominant negative inhibitor of androgen receptor comprising administering a mutagen to a nucleic acid encoding an ARA interacting protein forming a nucleic acid encoding a mutated ARA interacting protein, performing a screening system, wherein the system comprises the mutated ARA interacting protein and androgen receptor, assaying the activity of the androgen receptor, and identifying those mutated ARA interacting proteins that reduce androgen receptor activity.

21. The method of claim 20, wherein the mutagen comprises hydroxylamine.

22. A composition comprising an ARA267 peptide comprising a peptide having at least 80% identity to SEQ IDNO:34, wherein the peptide enhances androgen receptor transactivation of androgen receptor.

23. The composition of claim 22, wherein the mutant ARA wherein the mutant ARA further comprises an LXXLL motif.

24. The composition of claim 22, wherein the mutant ARA wherein the mutant ARA further comprises a SET motif.

25. The composition of claim 22, wherein the mutant ARA wherein the mutant ARA further comprises a proline rich region.

26. The composition of claim 22, wherein the mutant ARA wherein the mutant ARA further comprises a Ring finger motif.

27. The composition of claim 22, wherein the mutant ARA wherein the mutant ARA further

comprises a Zinc finger motif:

28. A composition comprising an ARA267 peptide comprising amino acids 1668-1795 of SEQ ID NO: 34, amino acids 726-730 of SEQ ID NO:34, and amino acids 1283-1287 of SEQ ID NO:34, amino acids 1324-1369 of SEQ ID NO:34 and amino acids 1884-1909 of SEQ ID NO:34.

29. A nucleic acid encoding the ARA267 of claims 22-28.

30. The nucleic acid of claims 29, wherein the nucleic acid further comprises a promoter sequence operably linked to the sequence encoding the ARA267.

31. A cell comprising the nucleic acid of claim 30.

32. An animal comprising the cell of claim 30.

33. A method of enhancing androgen receptor transactivation comprising administering the composition of claims 22-28.

34. A method of inhibiting androgen receptor transactivation comprising administering the nucleic acid of claims 30.

35. A method of identifying a molecule that modulates the activity of androgen receptor comprising administering the molecule to a system comprising androgen receptor and the composition of claims 22, assaying the activity of androgen receptor, and selecting molecules that modulate the activity of androgen receptor.

36. The method of claim 35, wherein the system further comprises ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

37. The method of claim 35, wherein the system further comprises a nucleic acid encoding the ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity.

38. The method of claim 35, wherein the system further comprises two molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

39. The method of claim 35, wherein the system further comprises three molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

40. The method of claim 35, wherein the system further comprises four molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

41. The method of claim 35, wherein the system further comprises five molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant

comprising androgen receptor modulating activity, in any combination.

42. The method of claim 35, wherein the system further comprises six molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.

43. The method of claim 35, wherein the system further comprises seven molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity in any combination.

44. The method of claim 35, wherein the system further comprises eight molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity in any combination.

45. The method of claim 35, wherein the system further comprises ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, and supervillin, or variant comprising androgen receptor modulating activity.

46. A composition comprising an isolated mutant of an ARA70 peptide comprising a peptide having at least 80% identity to SEQ IDNO:26, wherein the peptide prevents androgen receptor transactivation of androgen receptor.

47. The composition of claim 46, wherein the mutant ARA wherein the mutant ARA70 does not contain an LXXLL motif.

48. A composition comprising an isolated mutant of an ARA70 peptide comprising a peptide having at least 80% identity to amino acids 176-401 of SEQ ID NO IDNO:26, wherein the peptide prevents androgen receptor transactivation of androgen receptor.

49. A composition comprising an isolated mutant of an ARA70 peptide comprising a peptide having at least 80% identity to amino acids 176-401 of SEQ ID NO:26 and comprising an FXXLF domain, wherein the mutant ARA70 enhances androgen transactivation.

50. An isolated peptide comprising FXXLF, wherein the peptide interacts with androgen receptor, and wherein the peptide is not ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, and supervillin.

51. An isolated composition comprising FXXLF, wherein the peptide interacts with androgen receptor, and wherein the peptide is less than or equal to the size of ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, and supervillin.

52. A nucleic acid encoding the mutant ARA of claims 46.

53. The nucleic acid of claims 52, wherein the nucleic acid further comprises a promoter sequence operably linked to the sequence encoding the mutant ARA.

54. A cell comprising the nucleic acid of claim 52.

55. An animal comprising the cell of claim 54.
56. A method of inhibiting androgen receptor transactivation comprising administering the composition of claims 46.
57. A method of inhibiting androgen receptor transactivation comprising administering the nucleic acid of claim 53.
58. A method of identifying a molecule that modulates the activity of androgen receptor comprising administering the molecule to a system comprising androgen receptor and the composition of claim 46, assaying the activity of androgen receptor, and selecting molecules that modulate the activity of androgen receptor.
59. The method of claim 58, wherein the system further comprises ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
60. The method of claim 58, wherein the system further comprises a nucleic acid encoding the ARA54, ARA55, SRC-1, SRC-1, ARA24, Rb, ARA70, RB, ARA24, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity.
61. The method of claim 58, wherein the system further comprises two molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
62. The method of claim 58, wherein the system further comprises three molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
63. The method of claim 58, wherein the system further comprises four molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
64. The method of claim 58, wherein the system further comprises five molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
65. The method of claim 58, wherein the system further comprises six molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity, in any combination.
66. The method of claim 58, wherein the system further comprises seven molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant comprising androgen receptor modulating activity in any combination.
67. The method of claim 58, wherein the system further comprises eight molecules wherein the molecules are ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or variant

comprising androgen receptor modulating activity in any combination.

68. The method of claim 58, wherein the system further comprises ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, and supervillin, or variant comprising androgen receptor modulating activity.

69. A method of inhibiting androgen receptor activity comprising, administering a molecule that blocks an interaction between the androgen receptor and gelsolin.

70. The method of claim 69, wherein the molecule is a peptide.

71. The method of claim 70, wherein the peptide comprises a region of androgen receptor.

72. The method of claim 70, wherein the peptide comprises amino acids 551-600 of SEQ ID NO:44.

73. The method of claim 70, wherein the peptide comprises amino acids 655-695 of SEQ ID NO:44.

74. A method of identifying an androgen receptor activity inhibiting molecule, comprising administering a molecule or set of molecules to a system, wherein the system comprises androgen receptor and gelsolin, and assaying whether the molecule reduces the interaction between androgen receptor and gelsolin.

75. The method of claim 74, wherein the system further comprises an androgen receptor ligand.

76. The method of claim 75, wherein the ligand is DHT.

77. A method of identifying an mutant androgen receptor activity inhibiting molecule, comprising administering a molecule or set of molecules to a system, wherein the system comprises the mutant androgen receptor and gelsolin, and assaying whether the molecule reduces the interaction between the mutant androgen receptor and gelsolin.

78. The method of claim 77, wherein the system further comprises a mutant androgen receptor ligand.

79. The method of claim 78, wherein the ligand is HF.

80. A method of making a composition, the method comprising synthesizing a molecule, wherein the molecule inhibits androgen receptor activity, and wherein the molecule inhibits an interaction between androgen receptor and gelsolin.

81. A system comprising ARA267 or a peptide or protein comprising FXXLF.

82. The system of claim 81, wherein the ARA267 has at least 80% identity to the sequence set forth in SEQ ID NO:34.

83. The system of claim 81, wherein the system further comprises a cell.

84. The system of claim 81, wherein the system further comprises a androgen receptor.

85. The system of claim 81, wherein the system further comprises two of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

86. The system of claim 81, wherein the system further comprises three of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

87. The system of claim 81, wherein the system further comprises four of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

88. The system of claim 81, wherein the system further comprises five of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

89. The system of claim 81, wherein the system further comprises six of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

90. The system of claim 81, wherein the system further comprises seven of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

91. The system of claim 81, wherein the system further comprises eight of ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, or supervillin, or fragment or variant thereof.

92. The system of claim 81, wherein the system further comprises ARA54, ARA55, SRC-1, ARA24, Rb, ARA70, ARA267, gelsolin, and supervillin, or fragment or variant thereof.

93. A method of inhibiting androgen receptor activity comprising, administering a molecule that blocks an interaction between the androgen receptor and Supervillin.

94. The method of claim 93, wherein the supervillin comprises amino acids 558-1788 of SEQ IDNO:38.

95. The method of claim 93, wherein the peptide comprises amino acids 594-1335 of SEQ ID NO:38.

96. A method of inhibiting activity of a mutant androgen receptor comprising, administering a molecule that blocks an interaction between the mutant androgen receptor and supervillin.

97. The method of claim 96, wherein the molecule is a peptide.

98. The method of claim 96, wherein the peptide comprises a region of androgen receptor.

99. A method of identifying an androgen receptor activity inhibiting molecule, comprising administering a molecule or set of molecules to a system, wherein the system comprises androgen receptor and supervillin, and assaying whether the molecule reduces the interaction between androgen receptor and supervillin.

100. The method of claim 99, wherein the system further comprises an androgen receptor ligand.

101. The method of claim 100, wherein the ligand is DHT.

102. A method of making a composition, the method comprising synthesizing a molecule, wherein

the molecule inhibits androgen receptor activity, and wherein the molecule inhibits an interaction between androgen receptor and supervillin.